

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-264883

(43)Date of publication of application : 26.09.2001

(51)Int.Cl.

G03B 21/16

G02F 1/13

G02F 1/1333

H05K 7/20

(21)Application number : 2000-079380

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(22)Date of filing : 22.03.2000

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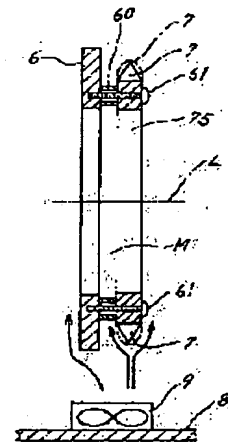
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(54) LIQUID CRYSTAL PROJECTOR

(57)Abstract:

PROBLEM TO BE SOLVED: To enhance the cooling effect of a liquid crystal panel.

SOLUTION: The channel of air to cool the liquid crystal panel 75 is provided between the panel 75 and a bracket 6. A branched line 7 presenting cross-sectional shape tapered toward its edge and permitting the air passing between the panel 75 and the bracket 6 to smoothly flow is formed at least on the upstream side of the channel on the panel 75.



LEGAL STATUS

[Date of request for examination]

24.10.2002

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

3490953

[Date of registration]

07.11.2003

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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CLAIMS

[Claim(s)]

[Claim 1] The liquid crystal panel (75) irradiated by the light source (71) and the bracket which supports this liquid crystal panel (75) (6), In the liquid crystal projector equipped with the fan (9) who cools a liquid crystal panel (75) between a liquid crystal panel (75) and a bracket (6) The passage of the air which cools a liquid crystal panel (75) is prepared. At least on a liquid crystal panel (75) to the upstream of this passage The liquid crystal projector characterized by forming ***** (7) which allows the air which has the cross-section configuration which becomes narrow toward a tip, and passes through between a liquid crystal panel (75) and brackets (6) to flow smoothly.

[Claim 2] A bracket (6) is a liquid crystal projector according to claim 1 which constitutes the justification device (1) which can rotate a liquid crystal panel (75) centering on four-directions migration and an optical axis L.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the liquid crystal projector which irradiates the image of a liquid crystal panel and copies it out with a powerful light.

[0002]

[Description of the Prior Art] Before, after irradiating the liquid crystal panel of three sheets corresponding to R, G, and B (the red, green, blue) which are the three primary colors of light with a strong light of the light source, light is compounded and the liquid crystal projector which projects an image on a screen is proposed. Drawing 7 is the cross-section top view of this liquid crystal projector. R by which the total reflection mirror (82a) (82d) (82b) of four sheets (82c) inclines, is arranged to an optical axis L, penetrates R, and reflects B and G in a cabinet (8) — a spectrum — G which reflects the ** dichroic mirror (83a) and G, and penetrates B — a spectrum — the ** dichroic mirror (83b) is arranged. After being condensed by the condensing lens (84) and carrying out a spectrum to R, G, and B with each dichroic mirror (83a) (83b), the light from the light source (71) irradiates the liquid crystal panel (75) corresponding to each, (74), and (76), and it is condensed by the prism object (80) and it is irradiated by the screen (not shown) from a projection lens (72). Drawing 8 is the side-face sectional view showing the maintenance structure of each liquid crystal panel (75). A liquid crystal panel (75) is stuck and attached in the whole surface of a metal bracket (6), and the fan (9) who cools a liquid crystal panel (75) under this bracket (6) is attached. The wind from a fan (9) flows upward and cools the field of the liquid crystal panel (75) which is not in contact with a bracket (6) and a bracket (6). Since a bracket (6) is metal, it is easy to absorb heat.

[0003]

[Problem(s) to be Solved by the Invention] Cooling air does not hit the field which is in contact with the bracket (6) on the liquid crystal panel (75) with the above-mentioned structure, but the cooling effect is low to it. In recent years, the request of a commercial scene to a raise in brightness of a liquid crystal projector is high, and making the light source (71) still brighter is called for. However, with the conventional structure, because the cooling effect is low, a possibility that it cannot respond to a demand of this commercial scene is. Moreover, if it is in the conventional structure, as shown in drawing 8 R> 8, the air from a fan (9) generated the vortex flow (62) in the inferior surface of tongue of a liquid crystal panel (75), and has barred the smooth flow of air. The cooling effect was low also at this point. This invention aims at heightening the cooling effect of a liquid crystal panel.

[0004]

[Means for Solving the Problem] Between the liquid crystal panel (75) and the bracket (6), the passage of the air which cools a liquid crystal panel (75) is prepared. On the liquid crystal panel (75), the cross-section configuration which becomes narrow toward a tip is presented to the upstream of this passage, and ***** (7) which allows the air which passes through between a liquid crystal panel (75) and brackets (6) to flow smoothly is formed in it. [at least]

[0005]

[Function and Effect] Since the passage of the air which cools a liquid crystal panel (75) is prepared between the liquid crystal panel (75) and the bracket (6), as for a liquid crystal panel (75), air cooling of the whole surface is carried out. Thereby, the cooling effect improves conventionally. Moreover, the air flow to a liquid crystal panel (75) passes along the passage between a liquid crystal panel (75) and a bracket (6) in ***** (7). Thereby, a vortex flow is not generated on a liquid crystal panel (75), but the air which cools a liquid crystal panel (75) flows smoothly.

[0006]

[Embodiment of the Invention] Hereafter, an example of this invention is explained in full detail using drawing. This example has the description in the structure of holding a liquid crystal panel (75), and arrangement of optics, such as a dichroic mirror in a liquid crystal projector, is the same as the conventional equipment shown in drawing 7 . Drawing 1 is the side-face sectional view of the bracket (6) holding a liquid crystal panel (75). A bracket (6) is metal and the screw (61) stop of the liquid crystal panel (75) is carried out to the bracket (6) through the spacer (60). Thereby, between a liquid crystal panel (75) and a bracket (6), Clearance M is formed and the passage of the air which cools a liquid crystal panel (75) is prepared.

[0007] In the fan (9) who does air cooling of the liquid crystal panel (75), a bracket (6) is prepared caudad and the air from a fan (9) flows upward. ***** (7) in which the tip sharpened, and (7) are prepared in the vertical edge of a liquid crystal panel (75). In the air which flowed toward the liquid crystal panel (75) from the fan (9), a part passes along the clearance M between a liquid crystal panel (75) and a bracket (6) in ***** (7), and others flow the outside of a liquid crystal panel (75), and cool both sides of a liquid crystal panel (75). By having prepared ***** (7), a vortex flow is not generated but the air which cools a liquid crystal panel (75) flows smoothly. In addition, it may change into a spacer (60), spinning may be performed to a bracket (6), and a projection may be formed. Moreover, ***** (7) may be prepared, the upstream, i.e., the lower limit section, of air flow. furthermore, if ***** (7) is a cross-section configuration to which width of face becomes narrow toward a tip, it is needed — an alternate long and short dash line shows to **, for example, drawing 1 , — as — being circular .

[0008] (Justification device) If it is in a **** liquid crystal projector, the justification device in which each liquid crystal panel (75), (74), and (76) are rotated centering on four-directions migration and an optical axis L is established, and the configuration which piles up the image corresponding to R, G, and B correctly is adopted. If it is in this example, the bracket (6) was piled up, the plate of four sheets was constituted, and it serves as the justification device (1). Before, the applicant is indicating this justification device (1) in JP,11-85027,A, and it shows an outline configuration below. Although the device in which the liquid crystal panel (75) of R is adjusted is illustrated if it is in below, the same device as other liquid crystal panels (74) and (76) is attached. Drawing 2 is the decomposition perspective view of a justification device (1). the fixed frame (2) with which a justification device (1) is fixed to a cabinet (8), and the movable frame for rotation adjustment — the movable frame for movable frame for (3) right-and-left adjustment (4) vertical adjustment (5) is piled up, and a metal plate is bent, respectively and it is constituted. A liquid crystal panel (75) is attached in the movable frame for rotation adjustment (3). Opening (20) which can penetrate the light of the light source (71), respectively in the lower part of a fixed frame (2) and a movable frame (3), (4), and (5), (30), (40), and (50) are established, and a liquid crystal panel (75) is a wrap about opening (30) of the movable frame for rotation adjustment (3). The core of each opening (20), (30), (40), and (50) is in agreement with an optical axis L.

[0009] (Structure of each frame)

Knock out plate (21) is horizontally formed in the upper limit left-hand side of a fixed frame fixed frame (2), and the notch (22) into which the adjustment screw (23) which carries out a postscript to this knock out plate (21) fits is established. The long hole (26) to which the pin for four-directions adjustment (55) which carries out a postscript fits into the up both sides and the lower left of a fixed frame (2) is established longwise. In the center of the upper part of a fixed frame (2), the through tube (24) which a fixed screw (15), (16), (16), and (referring to drawing 4) penetrate, (24), and (25) are established. [which carry out a postscript]

[0010] The movable frame for vertical adjustment (5) is arranged at the tooth-back side of the movable frame fixed frame for vertical adjustment (2). In the upper limit section both sides of the movable frame for vertical adjustment (5), knock out plate (51) and (52) are prepared horizontally, and the bis-hole (53) which said adjustment screw (23) screws in left-hand side knock out plate (51) is established. On right-hand side knock out plate (52), the eccentric shaft for right-and-left adjustment (54) is arranged. From the upper limit section both sides and lower limit section left-hand side of the movable frame for vertical adjustment (5), the pin for four-directions adjustment (55) has projected. An oblong through tube (56) is established in the center of the upper limit section of the movable frame for vertical adjustment (5), and a bis-hole (57) and (57) are established by the right-and-left both sides of a through tube (56) on the movable frame (5). A fixed screw (15) fits into a through tube (56), and a fixed screw (16) and (16) screw in a bis-hole (57) and (57).

[0011] The movable frame for right-and-left adjustment (4) is arranged, and knock out plate (41) is horizontally formed in the front-face side of the movable frame fixed frame for right-and-left adjustment (2) from the upper limit section of this movable frame for right-and-left adjustment (4). The left-hand side on this knock out plate (41), an eccentric shaft (42) is arranged free [rotation], and the path of said eccentric shaft (54) and the equal-width adjustment hole (43) are established in right-hand side. The long hole (44) into which said pin for four-directions adjustment (55) fits is established oblong by the movable frame for right-and-left adjustment (4). A bis-hole (45) is established in the center of the upper limit section of the movable frame for right-and-left adjustment (4), and a long hole (46) and (46) are established by right and left of this bis-hole (45) oblong. A fixed screw (15) screws in a bis-hole (45), and the fixed screw (65) which carries out a postscript, and (65) fit into a long hole (46) and (46). Moreover, from the movable frame for right-and-left adjustment (4), three pins for rotation adjustment (47), (47), and (47) have projected to the front.

[0012] The movable frame for rotation adjustment (3) is arranged at the front-face side of the movable frame for movable frame right-and-left adjustment for rotation adjustment (4). knock out plate (31) prepares in the upper limit section of the movable frame for rotation adjustment (3) horizontally — having — this knock-out-plate (31) top — the path of said eccentric shaft (42) — abbreviation — the adjustment hole (32) of equal width of face is established. The through tube (33) to which said pin for four-directions adjustment (55) gets into the upper limit section both sides and lower limit section left-hand side of the movable frame for rotation adjustment (3) free [migration] is established. In the center of the upper part of the movable frame for rotation adjustment (3), the through tube (34) which a fixed screw (15), (16), and (16) penetrate respectively free [migration], (35), and (35) are established. Moreover, the long hole (36) into which the pin for rotation adjustment (47) of the movable frame for right-and-left adjustment (4), (47), and (47) fit, (36), and (36) are established by the movable frame for rotation adjustment (3). The core of opening (30), i.e., the distance from an optical axis L, is in abbreviation etc. by carrying out, and each long hole (36) is established in the location.

[0013] (Assembly of a justification device) Drawing 3 (a) is the top view of a justification device (1), and drawing 3 (b) is a front view same as the above. Drawing 4 is the left lateral sectional view which fractured the justification device (1) in respect of the A-A line of drawing 3 (b) being included. First, the movable frame for right-and-left adjustment (4) is put on the movable frame for rotation adjustment (3), and the eccentric shaft (42) of the movable frame for right-and-left adjustment (4) is inserted in the adjustment hole (32) of the movable frame for rotation adjustment (3). Each pin for rotation adjustment (47) of the movable frame for right-and-left adjustment (4) is inserted in the long hole (36) to which the movable frame for rotation adjustment (3) corresponds. From a before [the movable frame for rotation adjustment (3)] side, a fixed screw (15) passes along the through tube (34) of the movable frame for rotation adjustment (3), and screws in the bis-hole (45) of the movable frame for right-and-left adjustment (4).

[0014] Next, the movable frame for right-and-left adjustment (4) which concluded the movable frame for rotation adjustment (3) is put on a fixed frame (2), and the movable frame for vertical adjustment (5) is put on the background of this fixed frame (2). The eccentric shaft (54) of the movable frame for vertical adjustment (5) is inserted in the adjustment hole (43) of the movable frame for right-and-left adjustment (4), and the pin for four-

directions adjustment (55) of the movable frame for vertical adjustment (5) is inserted in the long hole (44) to which the long hole (26) and the movable frame for right-and-left adjustment (4) with which a fixed frame (2) corresponds correspond. As shown in drawing 4 , when a fixed screw (16) and (16) penetrate the movable frame for right-and-left adjustment (4), and a fixed frame (2) and screw in the bis-hole (57) of the movable frame for vertical adjustment (5), and (57) from a before [the movable frame for rotation adjustment (3)] side The movable frame for rotation adjustment (3) and the movable frame for right-and-left adjustment (4) are concluded by the movable frame for vertical adjustment (5). The movable frame for vertical adjustment (5) is attached in a fixed frame (2) by inserting the head of an adjustment screw (23) in the notch (22) of a fixed frame (2), and screwing this adjustment screw (23) in a bis-hole (53).

[0015] In order to perform vertical adjustment vertical adjustment, as shown in drawing 4 , the adjustment screw (23) attached in the fixed frame (2) is rotated. An adjustment screw (23) drives the knock out plate (51) of the movable frame for vertical adjustment (5) up and down with a screw thrust. The pin for four-directions adjustment (55) of the movable frame for vertical adjustment (5), (55), and (55) slide on the inside of the long hole (26) of a fixed frame (2), (26), and (26) up and down. Moreover, said pin for four-directions adjustment (55), (55), (55), and a fixed screw (16) on either side and (16) push the vertical edge of the long hole (44) of the movable frame for right-and-left adjustment (4), (44), (44), and a long hole (46) and (46), respectively, and the movable frame for right-and-left adjustment (4) moves up and down united with the movable frame for vertical adjustment (5). If the movable frame for right-and-left adjustment (4) moves up and down, the pin for rotation adjustment (47) of the movable frame for right-and-left adjustment (4) shown in drawing 2 , (47), (47), and (47) Since the vertical edge of the long hole (36) of the movable frame for rotation adjustment (3), (36), (36), and (36) is pushed, the movable frame for rotation adjustment (3) moves up and down united with the movable frame for right-and-left adjustment (4).

[0016] Right-and-left adjustment drawing 5 (a) and (b) are drawings showing justification on either side, (a) is a top view and (b) is a front view. In order to perform right-and-left adjustment, the eccentric shaft (54) on the movable frame for vertical adjustment (5) is turned. An eccentric shaft (54) pushes the right-and-left edge of the adjustment hole (43) of the movable frame for right-and-left adjustment (4), and drives the knock out plate (41) of the movable frame for right-and-left adjustment (4) to a longitudinal direction. Since the pin for four-directions adjustment (55) of the movable frame for vertical adjustment (5), (55), (55), and a fixed screw (16) on either side and (16) have fitted in in the long hole (44) of the movable frame for right-and-left adjustment (4), (44), (44), and a long hole (46) and (46), respectively at this time, the movable frame for right-and-left adjustment (4) moves to right and left. As for the movable frame for push and rotation adjustment (3), the pin for rotation adjustment (47) of the movable frame for right-and-left adjustment (4), (47), and (47) move the edge of the long hole (36) of the movable frame for rotation adjustment (3), (36), and (36) to right and left united with the movable frame for right-and-left adjustment (4).

[0017] Rotation adjustment drawing 6 (a) and (b) are drawings showing rotation adjustment, (a) is a top view and (b) is a front view. In order to perform rotation adjustment, the eccentric shaft (42) attached in the movable frame for right-and-left adjustment (4) is rotated. An eccentric shaft (42) pushes the right-and-left edge of the adjustment hole (32) of the movable frame for rotation adjustment (3). The movable frame for rotation adjustment (3) is guided the pin for rotation adjustment (47) of the movable frame for right-and-left adjustment (4), (47), (47), and (47), and rotates the core L of opening (30), i.e., an optical axis, as a core.

[0018] As shown in drawing 4 , a spacer (60) is formed on the movable frame for rotation adjustment (3), a clearance is prepared between a liquid crystal panel (75) and the movable frame for rotation adjustment (3), and the passage of a fan's (9)'s air is formed. Moreover, by having prepared ***** (7) and (7) in the vertical edge of a liquid crystal panel (75), a vortex flow is not generated near the lower limit section of a liquid crystal panel (75), but the air which cools a liquid crystal panel (75) flows smoothly.

[0019] Explanation of the above-mentioned example is for explaining this invention, and it should not be understood so that invention of a publication may be limited to a claim or the range may be ****(ed). Moreover, as for each part configuration of this invention, it is needless to say for deformation various by technical within the limits given not only in the above-mentioned example but a claim to be possible.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the side-face sectional view of the device in which a liquid crystal panel is held.

[Drawing 2] It is the decomposition perspective view of a justification device.

[Drawing 3] (a) is the top view of a justification device and (b) is a front view same as the above.

[Drawing 4] It is the left lateral sectional view which fractured the justification device in respect of the A-A line of drawing 3 (b) being included.

[Drawing 5] (a) and (b) are drawings showing justification on either side, (a) is a top view and (b) is a front view.

[Drawing 6] (a) and (b) are drawings showing rotation adjustment, (a) is a top view and (b) is a front view.

[Drawing 7] It is the cross-section top view of a liquid crystal projector.

[Drawing 8] It is the side-face sectional view showing the maintenance structure of the conventional liquid crystal panel.

[Description of Notations]

(1) Justification device

(6) Bracket

(7) *****

(9) Fan

(71) Light source

(75) Liquid crystal panel

[Translation done.]

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号:

特開2001-264883

(P2001-264883A)

(43) 公開日 平成13年9月26日 (2001.9.26)

(51) Int.Cl. ⁷	識別記号	F I	テマコード [*] (参考)
G 0 3 B 21/16		G 0 3 B 21/16	2 H 0 8 8
G 0 2 F 1/13	5 0 5	G 0 2 F 1/13	5 0 5 2 H 0 8 9
	1/1333		5 E 3 2 2
H 0 5 K 7/20		H 0 5 K 7/20	H

審査請求 未請求 請求項の数 2 O L (全 6 頁)

(21) 出願番号 特願2000-79380(P2000-79380)

(22) 出願日 平成12年3月22日 (2000.3.22)

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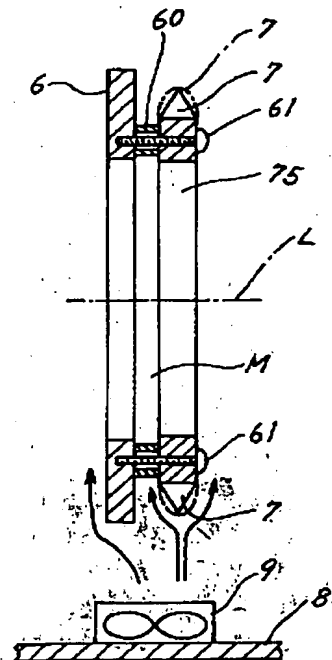
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(54) 【発明の名称】 液晶プロジェクタ

(57) 【要約】

【課題】 液晶パネルの冷却効果を高める。

【解決手段】 液晶パネル75とブラケット6の間には、液晶パネル75を冷却する空気の流路が設けられている。液晶パネル75上にて、少なくとも該流路の上流側には、先端に向かって幅狭になる断面形状を呈し、液晶パネル75とブラケット6の間を通過する空気がスムーズに流れることを許す分岐条7が形成されている。



(2)

【特許請求の範囲】

【請求項1】 光源(71)により照射される液晶パネル(75)と、該液晶パネル(75)を支持するブラケット(6)と、液晶パネル(75)を冷却するファン(9)を具えた液晶プロジェクタに於いて、

液晶パネル(75)とブラケット(6)の間には、液晶パネル(75)を冷却する空気の流路が設けられて、

液晶パネル(75)上にて、少なくとも該流路の上流側には、先端に向かって幅狭になる断面形状を有し、液晶パネル(75)とブラケット(6)の間を通過する空気がスムーズに流れることを許す分岐条(7)が形成されたことを特徴とする液晶プロジェクタ。

【請求項2】 ブラケット(6)は、液晶パネル(75)を上下左右移動及び光軸Lを中心に回転させることが可能な位置調整機構(1)を構成する請求項1に記載の液晶プロジェクタ。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、液晶パネルの画像を強力な光で照射して写し出す液晶プロジェクタに関するものである。

【0002】

【従来の技術】従来より、光の3原色であるR、G、B(赤、緑、青)に対応した3枚の液晶パネルを光源の強い光で照射した後に、光を合成し、スクリーンに画像を映し出す液晶プロジェクタが提案されている。図7は、該液晶プロジェクタの断面平面図である。キャビネット(8)内には、4枚の全反射ミラー(82a)(82b)(82c)(82d)が光軸Lに対して傾いて配備され、Rを透過してBとGを反射するR分光用ダイクロイックミラー(83a)、Gを反射してBを透過するG分光用ダイクロイックミラー(83b)が配備されている。光源(71)からの光は、コンデンサレンズ(84)に集光されて、各ダイクロイックミラー(83a)(83b)によってR、G、Bに分光された後に、夫々に対応する液晶パネル(75)(74)(76)を照射して、プリズム体(80)に集光されて投写レンズ(72)からスクリーン(図示せず)に照射される。図8は、各液晶パネル(75)の保持構造を示す側面断面図である。液晶パネル(75)は、金属製のブラケット(6)の一面に密着して取り付けられ、該ブラケット(6)の下方には液晶パネル(75)を冷却するファン(9)が取り付けられている。ファン(9)からの風は上向きに流れて、ブラケット(6)及びブラケット(6)に接していない液晶パネル(75)の面を冷却する。ブラケット(6)が金属製であるから、熱を吸収しやすい。

【0003】

【発明が解決しようとする課題】上記構造では、液晶パネル(75)上にて、ブラケット(6)に接している面には、冷却空気が当たらず、冷却効果が低い。近年、液晶プロジェクタは市場から高輝度化の要望が高く、光源(71)を更に明るくすることが求められている。しかし、従来の

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構造では冷却効果が低い故に、かかる市場の要求に対応できない虞れがある。また、従来の構造にあっては、図8に示すように、ファン(9)からの空気が液晶パネル(75)の下面に当たって渦流れ(62)を発生し、空気のスムーズな流れを妨げている。この点でも冷却効果が低かった。本発明は、液晶パネルの冷却効果を高めることを目的とする。

【0004】

【課題を解決する為の手段】液晶パネル(75)とブラケット(6)の間には、液晶パネル(75)を冷却する空気の流路が設けられている。液晶パネル(75)上にて、少なくとも該流路の上流側には、先端に向かって幅狭になる断面形状を呈し、液晶パネル(75)とブラケット(6)の間を通過する空気がスムーズに流れることを許す分岐条(7)が形成されている。

【0005】

【作用及び効果】液晶パネル(75)とブラケット(6)の間には、液晶パネル(75)を冷却する空気の流路が設けられているから、液晶パネル(75)は全面が空冷される。これにより、冷却効果は従来よりも改善される。また、液晶パネル(75)への空気流れは、分岐条(7)に当たって液晶パネル(75)とブラケット(6)の間の流路を通る。これにより、液晶パネル(75)上にて渦流れは発生せず、液晶パネル(75)を冷却する空気はスムーズに流れる。

【0006】

【発明の実施の形態】以下、本発明の一例を図を用いて詳述する。本例は、液晶パネル(75)を保持する構造に特徴があり、液晶プロジェクタ内のダイクロイックミラー等の光学部品の配置は、図7に示す従来の装置と同じである。図1は、液晶パネル(75)を保持するブラケット(6)の側面断面図である。ブラケット(6)は金属製であり、液晶パネル(75)はスペーサ(60)を介してブラケット(6)にビス(61)止めされている。これにより、液晶パネル(75)とブラケット(6)の間には、隙間Mが形成され、液晶パネル(75)を冷却する空気の流路が設けられる。

【0007】液晶パネル(75)を空冷するファン(9)は、ブラケット(6)の下方に設けられ、ファン(9)からの空気は上向きに流れる。液晶パネル(75)の上下端部には、先端が尖った分岐条(7)(7)が設けられている。ファン(9)から液晶パネル(75)に向かって流れた空気は、分岐条(7)に当たって、一部は液晶パネル(75)とブラケット(6)の隙間Mを通り、他は液晶パネル(75)の外側を流れ、液晶パネル(75)の両面を冷やす。分岐条(7)を設けたことにより、渦流れは発生せず、液晶パネル(75)を冷却する空気はスムーズに流れる。尚、スペーサ(60)に変えてブラケット(6)に絞り加工を施して、突起を形成してもよい。また、分岐条(7)は空気流れの上流側、即ち下端部のみに設けられていてもよい。更に、分岐条(7)は先端に向かって幅が狭くなる断面形状であればよく、例えば図1に一点鎖線で示すように、円弧状でもよ

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い。

【0008】(位置調整機構) 斯種液晶プロジェクトにあつては、各液晶パネル(75)(74)(76)を上下左右移動及び光軸Lを中心に回転させる位置調整機構を設けて、R、G、Bに対応した画像を正確に重ね合わせる構成が採用されている。本例にあつては、ブラケット(6)を4枚の板材を重ね合わせて構成し、位置調整機構(1)を兼ねている。この位置調整機構(1)は、以前出願人が特開平1-85027号にて開示しており、概略構成を以下に示す。以下にあつては、Rの液晶パネル(75)を調整する機構を例示するが、他の液晶パネル(74)(76)にも同様の機構が取り付けられる。図2は、位置調整機構(1)の分解斜視図である。位置調整機構(1)は、キャビネット(8)に固定される固定枠(2)及び回転調整用可動枠(3)、左右調整用可動枠(4)、上下調整用可動枠(5)を重ね合わせており、夫々金属板を折曲して構成される。回転調整用可動枠(3)に液晶パネル(75)が取り付けられる。固定枠(2)および可動枠(3)(4)(5)の下部には、夫々光源(71)の光が透過可能な開口(20)(30)(40)(50)が開設され、液晶パネル(75)は回転調整用可動枠(3)の開口(30)を覆う。各開口(20)(30)(40)(50)の中心は、光軸Lに一致している。

【0009】(各枠の構造)

固定枠

固定枠(2)の上端左側には、突出板(21)が水平に設けられ、該突出板(21)には、後記する調整ビス(23)が嵌まる切欠き(22)が開設されている。固定枠(2)の上部両側および下部左側には、後記する上下左右調整用ピン(55)が嵌合する長孔(26)が縦長に開設されている。固定枠(2)の上部中央には、後記する固定ビス(15)(16)(16)(図4参照)が貫通する貫通孔(24)(24)(25)が開設されている。

【0010】上下調整用可動枠

固定枠(2)の背面側には、上下調整用可動枠(5)が配備される。上下調整用可動枠(5)の上端部両側には、突出板(51)(52)が水平に設けられ、左側の突出板(51)には、前記調整ビス(23)が螺合するビス孔(53)が開設されている。右側の突出板(52)上には、左右調整用の偏心シャフト(54)が配備されている。上下調整用可動枠(5)の上端部両側および下端部左側からは、上下左右調整用ピン(55)が突出している。上下調整用可動枠(5)の上端部中央には、横長の貫通孔(56)が開設され、可動枠(5)上にて貫通孔(56)の左右両側にビス孔(57)(57)が開設されている。貫通孔(56)には固定ビス(15)が嵌まり、ビス孔(57)(57)には固定ビス(16)(16)が螺合する。

【0011】左右調整用可動枠

固定枠(2)の前面側には、左右調整用可動枠(4)が配備され、該左右調整用可動枠(4)の上端部からは突出板(41)が水平に設けられている。該突出板(41)上の左側には、偏心シャフト(42)が回転自在に配備され、右側には前記

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偏心シャフト(54)の径と等幅の調整孔(43)が開設されている。左右調整用可動枠(4)には前記上下左右調整用ピン(55)が嵌合する長孔(44)が横長に開設されている。左右調整用可動枠(4)の上端部中央には、ビス孔(45)が開設され、該ビス孔(45)の左右に長孔(46)(46)が横長に開設されている。ビス孔(45)には、固定ビス(15)が螺合し、長孔(46)(46)には、後記する固定ビス(65)(65)が嵌合する。また、左右調整用可動枠(4)からは3本の回転調整用ピン(47)(47)(47)が前方へ突出している。

10 【0012】回転調整用可動枠

左右調整用可動枠(4)の前面側には、回転調整用可動枠(3)が配備される。回転調整用可動枠(3)の上端部には、突出板(31)が水平に設けられ、該突出板(31)上には、前記偏心シャフト(42)の径に略等しい幅の調整孔(32)が開設されている。回転調整用可動枠(3)の上端部両側および下端部左側には、前記上下左右調整用ピン(55)が移動自在に嵌まる貫通孔(33)が開設されている。回転調整用可動枠(3)の上部中央には、固定ビス(15)(16)(16)が夫々移動自在に貫通する貫通孔(34)(35)(35)が開設されている。また、回転調整用可動枠(3)には、左右調整用可動枠(4)の回転調整用ピン(47)(47)(47)が嵌合する長孔(36)(36)(36)が開設されている。各長孔(36)は、開口(30)の中心、即ち光軸Lからの距離が略等しい位置に開設されている。

【0013】(位置調整機構の組立) 図3(a)は、位置調整機構(1)の平面図、図3(b)は同上の正面図である。図4は位置調整機構(1)を図3(b)のA-A線を含む面にて破断した左側面断面図である。まず、回転調整用可動枠(3)に左右調整用可動枠(4)を重ね、左右調整用可動枠(4)の偏心シャフト(42)を、回転調整用可動枠(3)の調整孔(32)に嵌める。左右調整用可動枠(4)の各回転調整用ピン(47)を、回転調整用可動枠(3)の対応する長孔(36)に嵌める。固定ビス(15)が、回転調整用可動枠(3)の前側から、回転調整用可動枠(3)の貫通孔(34)を通り、左右調整用可動枠(4)のビス孔(45)に螺合する。

【0014】次に、固定枠(2)に回転調整用可動枠(3)を締結した左右調整用可動枠(4)を重ね、該固定枠(2)の裏側に上下調整用可動枠(5)を重ねる。上下調整用可動枠(5)の偏心シャフト(54)を、左右調整用可動枠(4)の調整孔(43)に嵌め、上下調整用可動枠(5)の上下左右調整用ピン(55)を、固定枠(2)の対応する長孔(26)および左右調整用可動枠(4)の対応する長孔(44)に嵌める。図4に示すように、固定ビス(16)(16)が、回転調整用可動枠(3)の前側から、左右調整用可動枠(4)及び固定枠(2)を貫通し、上下調整用可動枠(5)のビス孔(57)(57)に螺合することにより、回転調整用可動枠(3)および左右調整用可動枠(4)は、上下調整用可動枠(5)に締結される。固定枠(2)の切欠き(22)に調整ビス(23)の頭部を嵌め、該調整ビス(23)をビス孔(53)に螺合することによ

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り、上下調整用可動枠(5)は、固定枠(2)に取り付けられる。

【0015】上下調整

上下調整を行なうには、図4に示すように、固定枠(2)に取り付けた調整ビス(23)を回転する。調整ビス(23)は、ネジ推力により、上下調整用可動枠(5)の突出板(51)を上下に駆動する。上下調整用可動枠(5)の上下左右調整用ピン(55)(55)(55)は、固定枠(2)の長孔(26)(26)(26)内を上下に摺動する。また、前記上下左右調整用ピン(55)(55)(55)および左右の固定ビス(16)(16)が、夫々左右調整用可動枠(4)の長孔(44)(44)(44)および長孔(46)(46)の上下縁を押して、左右調整用可動枠(4)は、上下調整用可動枠(5)と一体となって上下に移動する。左右調整用可動枠(4)が上下に移動すると、図2に示す左右調整用可動枠(4)の回転調整用ピン(47)(47)(47)(47)が、回転調整用可動枠(3)の長孔(36)(36)(36)(36)の上下縁を押すから、回転調整用可動枠(3)が左右調整用可動枠(4)と一体となって上下に移動する。

【0016】左右調整

図5(a)、(b)は、左右の位置調整を示す図であり、(a)は平面図、(b)は正面図である。左右調整を行なうには、上下調整用可動枠(5)上の偏心シャフト(54)を回す。偏心シャフト(54)は、左右調整用可動枠(4)の調整孔(43)の左右縁を押して、左右調整用可動枠(4)の突出板(41)を左右方向に駆動する。このとき、上下調整用可動枠(5)の上下左右調整用ピン(55)(55)(55)及び左右の固定ビス(16)(16)が、夫々左右調整用可動枠(4)の長孔(44)(44)(44)及び長孔(46)(46)内に嵌まっているから、左右調整用可動枠(4)は左右に移動する。左右調整用可動枠(4)の回転調整用ピン(47)(47)(47)が、回転調整用可動枠(3)の長孔(36)(36)(36)の端縁を押す、回転調整用可動枠(3)は左右調整用可動枠(4)と一体となって左右に移動する。

【0017】回転調整

図6(a)、(b)は、回転調整を示す図であり、(a)は平面図、(b)は正面図である。回転調整を行なうには、左右調整用可動枠(4)に取り付けた偏心シャフト(42)を回転する。偏心シャフト(42)は、回転調整用可動枠(3)の調整孔(32)の左右縁を押す。回転調整用可動枠(3)は、左

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右調整用可動枠(4)の回転調整用ピン(47)(47)(47)(47)に案内されて開口(30)の中心、即ち光軸Lを中心として回転する。

【0018】図4に示すように、回転調整用可動枠(3)上にスペーサ(60)を設けて、液晶パネル(75)と回転調整用可動枠(3)の間に隙間を設けて、ファン(9)の空気の流路を形成している。また、液晶パネル(75)の上下端部に分岐条(7)(7)を設けていることにより、液晶パネル(75)の下端部近傍にて渦流れは発生せず、液晶パネル(75)を冷却する空気はスムーズに流れる。

【0019】上記実施例の説明は、本発明を説明するためのものであって、特許請求の範囲に記載の発明を限定し、或は範囲を減縮する様に解すべきではない。又、本発明の各部構成は上記実施例に限らず、特許請求の範囲に記載の技術的範囲内で種々の変形が可能であることは勿論である。

【図面の簡単な説明】

【図1】液晶パネルを保持する機構の側面断面図である。

【図2】位置調整機構の分解斜視図である。

【図3】(a)は、位置調整機構の平面図、(b)は同上の正面図である。

【図4】位置調整機構を図3(b)のA-A線を含む面にて破断した左側面断面図である。

【図5】(a)、(b)は、左右の位置調整を示す図であり、(a)は平面図、(b)は正面図である。

【図6】(a)、(b)は、回転調整を示す図であり、(a)は平面図、(b)は正面図である。

【図7】液晶プロジェクタの断面平面図である。

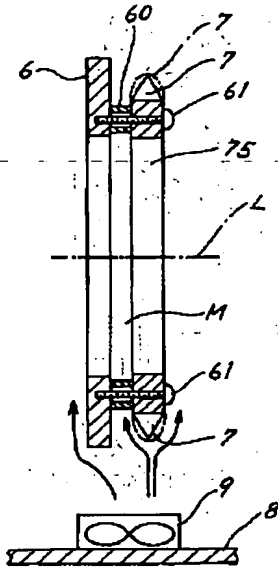
【図8】従来の液晶パネルの保持構造を示す側面断面図である。

【符号の説明】

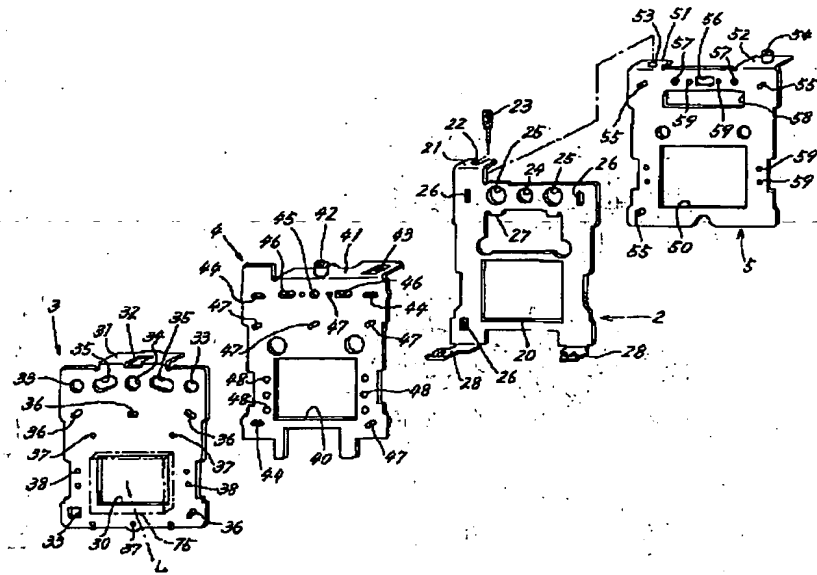
- (1) 位置調整機構
- (6) ブラケット
- (7) 分岐条
- (9) ファン
- (71) 光源
- (75) 液晶パネル

(5)

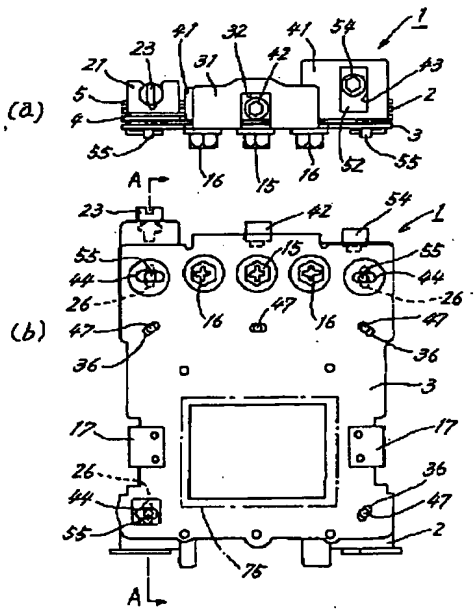
【図1】



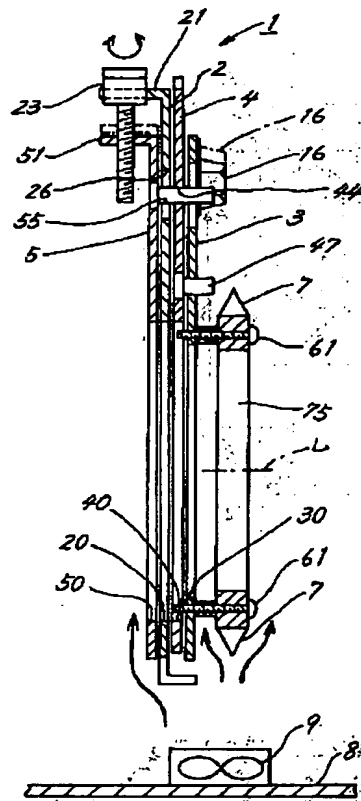
【図2】



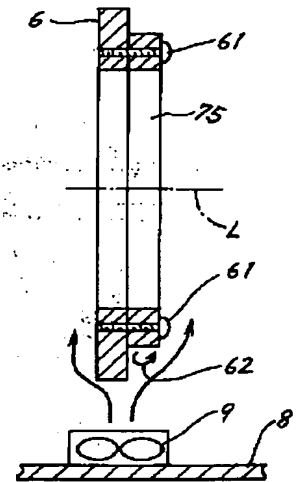
【図3】



【図4】

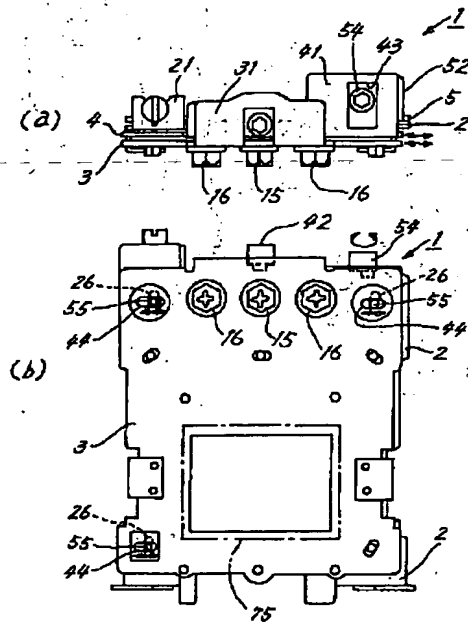


【図8】

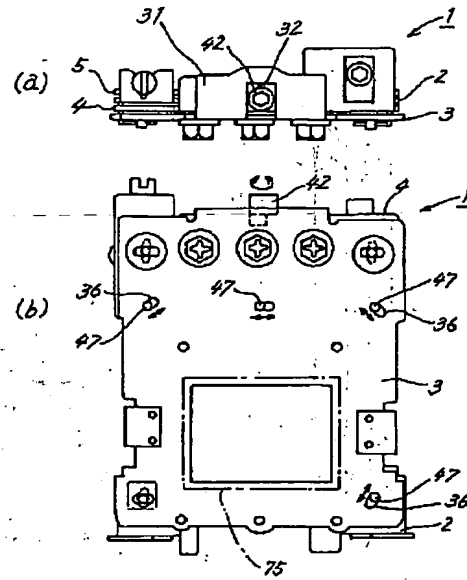


(6)

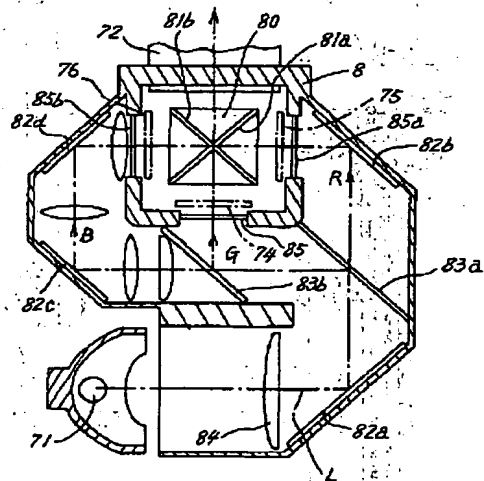
【図5】



【図6】



【図7】



フロントページの続き

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Fターム(参考) 2H088 EA12 HA13 HA23 HA28 MA20
2H089 JA10 QA06 TA18 UA05
5E322 BA05 BB10 EA11

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